Claims

What is claimed is:

[c1]   A directory server comprising:

a supplier server;

a consumer server in communication with the supplier server;

a plurality of pluggable services that manage replication of data contained within the directory server from the supplier server to the consumer server; and

a change sequence number used to determine ordering of operations performed on the consumer server;

wherein replication of data is managed using the change sequence number.

[c2]   The directory server of claim 1 wherein the change sequence number is a tuple comprising a time stamp portion, a sequence number portion, a replica identifier portion, and a sub-sequence number portion.

[c3]   The directory server of claim 1, wherein a highest value of the change sequence number is maintained in stable storage.

[c4]   The directory server of claim 2, wherein the timestamp portion is represented by logical time and is thirty-two bits in length.

[c5]   The directory server of claim 2, wherein the timestamp portion comprises a network offset component.

[c6]   The directory server of claim 2, wherein the sequence number portion is generated by an incremental counter and is sixteen bits in length.

[c7] The directory server of claim 2, wherein the replica identifier portion denotes an identifier of the consumer server that generated the change sequence number and is sixteen bits in length.

[c8] The directory server of claim 2, wherein the sub-sequence number portion is used to order operations within a single operation and is sixteen bits in length.

[c9] The directory server of claim 2, wherein the change sequence number is assigned when an entry is modified by a client.

[c10] A method of generating a change sequence number, comprising:

initializing the change sequence number;

retrieving a timestamp portion;

retrieving a sequence number portion;

retrieving a replica identifier portion; and

retrieving a sub-sequence number portion;

wherein the timestamp portion, the sequence portion, the replica identifier portion, and the sub-sequence portion are joined into a tuple that forms the change sequence number.

[c11] The method of claim 10, further comprising:

maintaining a highest value of the change sequence number in stable storage.

[c12] The method of claim 10, wherein the timestamp portion is represented by logical time and is thirty-two bits in length.

[c13] The method of claim 10, wherein the timestamp portion comprises a network offset component.

[c14] The method of claim 10, wherein the sequence number portion is generated by an incremental counter and is sixteen bits in length.

[c15] The method of claim 10, wherein the replica identifier portion denotes an identifier of a server that generated the change sequence number and is sixteen bits in length.

[c16] The method of claim 10, wherein the sub-sequence number portion is used to order operations within a single operation and is sixteen bits in length.

[c17] The method of claim 10, wherein the change sequence number is assigned when an entry is modified by a client.

[c18] An apparatus for generating a change sequence number, comprising:

means for initializing the change sequence number;

means for retrieving a timestamp portion;

means for retrieving a sequence number portion;

means for retrieving a replica identifier portion;

means for retrieving a sub-sequence number portion; and

means for joining the timestamp portion, the sequence portion, the replica identifier portion, and the sub-sequence portion into a tuple that forms the change sequence number.